

What Is Claimed Is:

1. An array substrate for a reflective liquid crystal display device, the substrate comprising:
  - a gate line and a data line defining a pixel region by crossing each other;
  - a switching element at a crossing portion of the gate line and the data line;
  - a first passivation layer covering the switching element and the data line, the first passivation layer being formed of an inorganic insulating material;
  - a reflective electrode on the first passivation layer, the reflective electrode being connected to the switching element; and
  - a second passivation layer on the reflective electrode, the second passivation layer being formed of an organic insulating material.
2. The device according to claim 1, wherein
  - the reflective electrode includes conductive metal material such as aluminum (Al) or aluminum alloys.
3. The device according to claim 1, wherein
  - the switching element is a thin film transistor including a gate electrode, a source electrode, a drain electrode and an active layer.
4. The device according to claim 1, wherein
  - the first passivation layer includes silicon nitride ( $\text{SiN}_x$ ).
5. The device according to claim 1, wherein
  - the second passivation layer is an organic insulating material including benzocyclobutene (BCB) or an acrylic resin.
6. A manufacturing method of an array substrate for a reflective liquid crystal display device, the method comprising the steps of:

forming a gate line and a data line such that the gate line and data line define a pixel region by crossing each other;

forming a switching element at a crossing portion of the gate line and the data line;

forming a first passivation layer covering the switching element and the data line, the first passivation layer being formed of an inorganic insulating material;

forming a reflective electrode on the first passivation layer, the reflective electrode being connected to the switching element; and

forming a second passivation layer on the reflective electrode, the second passivation layer being formed of an organic insulating material.

7. The method according to claim 6, wherein  
the reflective electrode is formed of conductive metal material including aluminum (Al) or an aluminum alloys.

8. The method according to claim 6, wherein  
the switching element is a thin film transistor including a gate electrode, a source electrode, a drain electrode and an active layer.

9. The method according to claim 6, wherein  
the first passivation layer is formed of silicon nitride ( $\text{SiN}_x$ ).

10. The method according to claim 6, wherein  
the second passivation layer is formed of an organic insulating material including benzocyclobutene (BCB) or an acrylic resin.

11. An array substrate for a transfective liquid crystal display device, the substrate comprising;

a gate line and a data line defining a pixel region by crossing each other;

a switching element at a crossing portion of the gate line and the data line;

a first passivation layer covering the switching element and the data line, the first passivation layer being formed of an inorganic insulating material;

a reflective electrode on the first passivation layer, the reflective electrode being connected to the switching element and including a transmission hole;

a second passivation layer on the reflective electrode, the second passivation layer being formed of organic insulating material and patterned to expose a part of the switching element; and

a transparent pixel electrode on the second passivation layer, the pixel electrode being formed in the pixel region and contacting the exposed part of the switching element.

12. The device according to claim 11, wherein

the reflective electrode is formed of a conductive metal material including aluminum (Al) or aluminum alloys.

13. The device according to claim 11, wherein

the switching element is a thin film transistor including a gate electrode, a source electrode, a drain electrode and an active layer.

14. The device according to claim 11, wherein

the first passivation layer is formed of silicon nitride ( $\text{SiN}_x$ ).

15. The device according to claim 11, wherein

the second passivation layer is formed of an organic insulating material including benzocyclobutene (BCB) or an acrylic resin.

16. A manufacturing method of an array substrate for a transfective liquid crystal display device, the method comprising the steps of:

forming a gate line and a data line defining a pixel region by crossing each other;

forming a switching element at a crossing portion of the gate line and the data line;

forming a first passivation layer covering the switching element and the data line, the first passivation layer being formed of an inorganic insulating material;

forming a reflective electrode on the first passivation layer, the reflective electrode being connected to the switching element and including a transmission hole;

forming a second passivation layer on the reflective electrode, the second passivation layer being formed of an organic insulating material and patterned to expose a part of the switching element; and

forming a transparent pixel electrode on the second passivation layer, the pixel electrode being formed in the pixel region and contacting the exposed part of the switching element.

17. The method according to claim 16, wherein  
the reflective electrode is formed of a conductive metal material including aluminum (Al) or an aluminum alloy.

18. The method according to claim 16, wherein  
the switching element is a thin film transistor including a gate electrode, a source electrode, a drain electrode and an active layer.

19. The method according to claim 16, wherein  
the first passivation layer is formed of silicon nitride ( $\text{SiN}_x$ ).

20. The method according to claim 16, wherein  
the second passivation layer is formed of an organic insulating material including benzocyclobutene (BCB) or acrylic resin.

21. An array substrate for a transfective liquid crystal display device, the substrate comprising;

a thin film transistor including an active layer, a gate electrode and source and drain electrodes, formed sequentially on a substrate;

a gate line including connected to the gate electrode;

a gate pad at a first end of the gate line;

a storage line parallel to the gate line and spaced apart from the gate line;

a data line defining a pixel region by crossing the gate line, the data line being connected to the source electrode;  
 a data pad at one end of the data line;  
 an organic insulating layer over the thin film transistor and the data line;  
 a barrier layer on the organic insulating layer, the barrier layer being formed of an inorganic insulating material;  
 a reflector on the barrier layer;  
 an inorganic insulating layer between the reflector and the pixel electrode; and  
 a transparent pixel electrode on the inorganic insulating layer, the pixel electrode contacting the drain electrode.

22. The substrate according to claim 21, further comprising:  
 an insulating layer beneath the organic insulating layer for performing a hydrogenation process of the thin film transistor.

23. The substrate according to claim 21, further comprising:  
 a buffer layer beneath the active layer, the buffer layer including an inorganic insulating material such as silicon oxide ( $\text{SiO}_2$ ) or silicon nitride ( $\text{SiN}_x$ ).

24. The substrate according to claim 21, wherein  
 the active layer is formed of polysilicon.

25. The substrate according to claim 21, wherein  
 the storage line and gate line are formed of a same material and on a same layer.

26. The substrate according to claim 21, wherein  
 the reflector is formed of a conductive metal material including aluminum (Al) or an aluminum alloys.

27. The substrate according to claim 21, wherein

the pixel electrode is formed of a transparent conductive material including indium tin oxide (ITO) or indium zinc oxide (IZO).

28. The substrate according to claim 21, wherein the reflector extends to the data line and covers the thin film transistor.
29. The substrate according to claim 21, wherein the reflector is partially overlapped with the gate line or the data line.
30. The substrate according to claim 21, wherein the reflector covers the thin film transistor.
31. The substrate according to claim 21, wherein the barrier layer is formed using inorganic insulating material including silicon oxide ( $\text{SiO}_2$ ) or silicon nitride ( $\text{SiN}_x$ ), for example.
32. A method of forming an array substrate for a transfective liquid crystal display device, the method comprising the steps of:
  - forming a thin film transistor including a substrate and sequentially forming an active layer, a first insulating layer, a gate electrode, a second insulating layer and source and drain electrodes on the substrate;
  - forming a gate line and a storage line, the storage line being formed parallel to the gate line and being spaced apart from the gate line;
  - forming a gate pad at a first end of the gate line;
  - forming a data line defining a pixel region by crossing the gate line, the data line being connected to the source electrode;
  - forming a data pad at a first end of the data line;
  - forming a third insulating layer over the thin film transistor and the data line, the third insulating layer being formed of transparent organic insulating material;
  - forming a fourth insulating layer on the third insulating layer, the fourth insulating layer being a barrier layer and being formed of inorganic insulating material;

forming a reflector on the barrier layer;  
forming a drain contact hole over the drain electrode by depositing and patterning a fifth insulating layer on the reflector;  
forming an inorganic insulating layer between the reflector and the pixel electrode; and  
forming a transparent pixel electrode on the inorganic insulating layer, the pixel electrode contacting the drain electrode.

33. The method according to claim 32, further comprising:  
forming an insulating layer beneath the organic insulating layer to perform a hydrogenation process of the thin film transistor
34. The method according to claim 32, further comprising:  
forming a buffer layer beneath the active layer using an inorganic insulating material including silicon oxide ( $\text{SiO}_2$ ) or silicon nitride ( $\text{SiN}_x$ ).
35. The method according to claim 32, wherein  
the active layer is formed of polysilicon.
36. The method according to claim 32, wherein  
the storage line and gate line are formed with a same material and on a same layer.
37. The method according to claim 32, wherein  
the reflector is formed of a conductive metal material including aluminum (Al) or an aluminum alloy.
38. The method according to claim 32, wherein  
the pixel electrode is formed of transparent conductive material including indium tin oxide (ITO) or indium zinc oxide (IZO).
39. The method according to claim 32, wherein

the reflector is extended to the data line and covers the thin film transistor.

40. The method according to claim 32, wherein  
the reflector is partially overlapped with the gate line or the data line.
41. The method according to claim 32, wherein  
the reflector covers the thin film transistor.
42. The method according to claim 32, wherein  
the barrier layer is formed using an inorganic insulating material including  
silicon oxide ( $\text{SiO}_2$ ) or silicon nitride ( $\text{SiN}_x$ ).
43. The method according to claim 32, wherein  
the drain contact hole is formed by etching the third insulating layer, the  
fourth insulating layer and the fifth insulating layer simultaneously with an etching gas  
including about 65-80% of oxygen gas.